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***Developmental Engineering***

***SYSTEM SURVIVABILITY***

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This instruction implements AFPD 62-2, *System Survivability*. It also implements portions of Department of Defense (DoD) Directive 5000.1, *Defense Acquisition*, February 23, 1991; DoD Instruction 5000.2, *Defense Acquisition Management Policies and Procedures*, February 23, 1991, with Change 1, and Air Force Supplement 1, *Acquisition Management Policies and Procedures*, August 31, 1993, with Change 1; DoD Directive 3150.3, *Survivability and Security (S2) of Nonstrategic Nuclear Forces (NSNF)*, January 23, 1991; AFPD 63-1, *Acquisition System*, August 1993; and AFI 63-101, *Air Force Acquisition System Procedures*. Other related policies and instructions include AFPD 10-6, *Mission Need and Operational Requirements*, January 1993; AFI 10-601, *Mission Needs and Operational Requirements Guidance and Procedures*, February 1993; AFPD 99-1, *Test and Evaluation Process*, July 1993; AFI 99-101, *Developmental Test and Evaluation*; AFI 99-102, *Operational Test and Evaluation*; AFI 99-105, *Live Fire Test and Evaluation*; AFPD 31-7, *Acquisition Security*, March 2, 1993; and AFI 31-701, *Program Protection Planning*, February 18, 1994. This instruction gives guidance for managing the life-cycle of survivable Air Force systems. **Attachment 1** is a glossary of references, abbreviations, acronyms, and terms.

***SUMMARY OF REVISIONS***

This is the initial publication of AFI 62-2019. It outlines the procedures and responsibilities for managing the life cycle of survivable Air Force systems.

# Chapter 1

## AIR FORCE HEADQUARTERS PROCESS

### 1.1. Office of the Secretary of the Air Force.

#### 1.1.1. Assistant Secretary of the Air Force for Acquisition (SAF/AQ) SAF/AQ:

- Oversees system survivability for the Air Force.
- Establishes survivability policy.
- Directs the research, development, and acquisition of survivable systems.

#### 1.1.2. Director of Long-Range Power Projection, Special Operations Forces, Airlift and Training Programs (SAF/AQQ). SAF/AQQ:

- Monitors the Air Force system survivability program.
- Chairs the Survivability Review Group (SRG).

##### 1.1.2.1. Long-Range Power Projection Division (SAF/AQQS). SAF/AQQS:

- Oversees the Air Force system survivability program.
- Serves as the OPR for AFPD 62-2 and this AFI.

#### 1.1.3. Survivability Review Group. The SRG meets as necessary to review and resolve issues related to:

- Air Force survivability policy.
- Survivability requirements, parameters, or status of specific systems.
- Air Force-wide status assessments of systems with survivability requirements.

1.1.3.1. The SRG forwards the Air Force-wide assessments to appropriate 2-letter organizations for review or necessary actions.

1.1.3.2. The SRG includes senior representatives (O-6 or above). For a list of representatives, see **Table 1.1**.

**Table 1.1. Survivability Review Group Membership.**

SAF/AQQ	Chair	AF/SCM	Member
AF/CEC	Member	AF/TEP	Member
AF/CEO	Member	AF/XOF	Member
AF/INA	Member	AF/XOR	Member
AF/LGM	Member	SAF/Mission Area Directors	Member

#### 1.1.4. SAF/AQ Mission Area Directors. Directors:

- Monitor the survivability status of their assigned systems.
- Help users define reasonable survivability parameters for their systems and monitor all aspects of survivability throughout the system's life cycle .
- Support the Air Force Systems Acquisition Review Council (AFSARC) or Defense Acquisition Board (DAB).

- Appoint a representative to the SRG.
- If required, oversee a specific survivability threat category, such as electronic warfare, nuclear effects, or nuclear, biological, and chemical (NBC) contamination.

**1.1.5. HQ USAF Survivability OPRs.** OPRs act as HQ USAF points-of-contact for system survivability issues related to the threats for which they are responsible. For OPRs and threat categories, see **Table 1.2.**

1.1.5.1. Threat categories from DoD Instruction 5000.2 include:

- Nuclear
- Advanced technology weapons
- Conventional weapons
- Nuclear, biological, and chemical contamination
- Electronic warfare

**NOTE:**

A sixth category, sabotage and terrorism, includes weapons from the categories shown above. Survivability against those weapons is handled by the corresponding OPR. Sabotage and terrorism also includes the threat to hardware, software, or other equipment from tampering. Systems that must survive this type of sabotage or terrorism threat may require system protection measures. AFI 31-701 , *Program Protection Planning*, addresses the appropriate measures to protect systems against terrorism or sabotage.

1.1.5.2. OPRs:

- Keep records for each system with survivability requirements, including the recommended parameters and approved survivability strategies.
- Notify all organizations involved with the system immediately if any actions affect the system's survivability requirements.
- Monitor the systems' compliance with the Air Force's System Survivability Program by reviewing and processing the information in Survivability Management Status Reports (SMSRs).
- Use the SMSRs to develop the metrics outlined in **Attachment 1** of AFPD 62-2.
- Serve as the waiver-granting authority for SMSRs.
- Determine the need for, and, if required, set up working groups to help the Air Force manage, set policy for, and address survivability issues. (See paragraph **1.1.6.** for an example of a working group.)
- Distribute copies of SMSRs to members of working groups as necessary.

1.1.5.3. OPRs may designate an outside organization for additional support.

**Table 1.2. HQ USAF Survivability OPRs.**

Threat Category	Office of Primary Responsibility
Nuclear (Affecting all systems) Advanced Technology Weapons ( <i>EXCEPTION</i> : Space systems .)	SAF/AQQS: Long-range Power Projection Division
Conventional Weapons (Affecting aircraft)	SAF/AQPF: Fighter Division
Conventional Weapons (Affecting facilities)	AF/CEOR: Readiness Programs Division
Advanced Technology Weapons (Affecting space systems)	SAF/AQSC: Space C3I Division
NBC contamination	SAF/AQPT: Combat Systems Division
Electronic warfare	SAF/AQPE: Electronic Combat Division

**1.1.6. Nuclear Survivability Steering Group (NSSG).** The NSSG, chaired by SAF/AQQS (the OPR for nuclear survivability), provides guidance to the Air Force for nuclear survivability. Action officers meet semiannually to ensure that systems having survivability requirements against nuclear threats meet these requirements throughout their life cycles according to Air Force policies. See **Table 1.3.** for the composition of the NSSG.

**Table 1.3. Composition of the Nuclear Survivability Steering Group.**

SAF/AQQS	Chair	AFOTEC	Member
SAF/AQPT	Member	PL/WS	Technical Advisor
HQ USAF/LGMW	Member	HQ USAF/CEOR	Facilities Logistic Advisor
HQ USAF/LGMY	Member	Det 1, CSC/DEE	Technical Advisor
HQ USAF/XOFS	Member	OC-ALC/ TI	Technical Advisor
HQ AFMC	Member	OO-ALC/ LM	Technical Advisor
HQ ACC	Member	SA-ALC/ NW	Technical Advisor
HQ AMC	Member	SM-ALC/ TI	Technical Advisor
HQ AFSPC	Member	SM-ALC, Det 25	Technical Advisor
HQ AETC	Member	OAS/XRS	Parameter Advisor

**1.1.7. Air Force Program Executive Officers.** Program Executive Officers (PEOs):

- Help system program directors (SPDs) develop and execute a system survivability program in accordance with user requirements and objectives.
- Ensure that test and evaluation master plans (TEMPs) includes plans for survivability testing and analysis.
- Contact survivability OPRs when supporting or collateral systems place critical survivability limitations on a system under development.
- Coordinate on annual SMSRs for each system in their portfolios.

**1.2. Air Staff:**

**1.2.1. Deputy Chief of Staff for Plans and Operations (AF/XO) AF/XO:**

- Handles operational issues concerning survivability.
- Ensures that the Air Force identifies and meets survivability requirements.

**1.2.1.1. Directorate for Operational Requirements (AF/XOR). AF/XOR:**

- Reviews, evaluates, and manages system requirement documents.
- Serves as the lead directorate for operational survivability.
- Determines operational survivability requirements based on:
  - Concepts of operation.
  - Test and evaluation.
  - Procedures for the employment of a system.
  - Appraisals include strategies necessary to survive and perform in hostile environments.
- Appoints a representative to the SRG.

**1.2.1.2. Directorate of Forces (AF/XOF). AF/XOF:**

- Is responsible for planning, programming, budgeting, and equipping all combat forces.
- Serves as lead for:
  - Developing executable programs.
  - Reviewing and defining budgets.
  - Monitoring program execution for deployment and employment of systems.
    - Prepares or monitors operational initiatives and strategies for balancing of force readiness and sustainability against force modernization.
  - Appoints a representative to the SRG.

**1.2.2. Deputy Chief of Staff for Logistics (AF/LG). AF/LG:**

- Oversees hardness assurance, maintenance, and surveillance (HAMS) programs.
- Establishes policy, procedures, and programs to maintain the survivability and battle damage repairability of Air Force systems other than facilities and communications.

**1.2.2.1. Directorate of Maintenance (AF/LGM). AF/LGM:**

- Serves as the primary staff manager for HAMS.
- Ensures that maintenance policies, procedures, and programs preserve or restore required levels of survivability for Air Force systems.
- Informs the appropriate survivability OPR of actions affecting system survivability.
- Appoints a representative to the SRG.

**1.2.3. Air Force Civil Engineer (AF/CE). AF/CE establishes policy, procedures, and programs to acquire and maintain survivable facilities.**

**1.2.3.1. Directorate of Military Construction (AF/CEC) AF/CEC:**

- Serves as the primary staff manager for:
  - Acquiring survivable facilities.

- Ensuring that the military construction program considers and validates survivability requirements before approving a system.
- Ensuring that program documents clearly identify survivability requirements.
  - Monitors research and development for facility survivability to ensure that new facilities and survivability retrofits utilize current survivability methods.
  - Appoints a representative to the SRG.

**1.2.3.2. Directorate of Operations and Readiness (AF/CEO). AF/CEO:**

- Serves as the primary staff manager for maintaining survivable facilities.
- Establishes Air Force-wide policies for facility HAMS.
- Ensures that changes to survivable facilities don't degrade their existing survivability characteristics.
- Develops
  - Procedures to maintain survivability requirements for hardened facilities.
  - Techniques to survey system survivability.
  - Methods to determine the impact on system survivability of changes in either facility hardness or threat environments.
    - Maintains records of all facilities with survivability requirements along with cost estimates and costs incurred for hardening facilities. This record includes the recommended or established survivability objectives and thresholds and methods for verifying them.
    - Appoints a representative to the SRG.

**1.2.4. Deputy Chief of Staff for Command, Control, Communications, and Computers (AF/SC). AF/SC:**

- Oversees the survivability program for telecommunications, computer resources, data automation, communications-electronics, and command and control systems.
- Appoints a representative to the SRG.

**1.2.5. Assistant Chief of Staff/Intelligence (AF/IN). AF/IN:**

- Approves threat assessment reports, threat environment definitions, and other system-specific threat assessments used to develop system survivability requirements and parameters.
- Develops guidance on threats during all phases of systems' life cycles.
- Provides this guidance to the implementing, supporting, and using organizations, SAF/AQ directorates, and other Air Staff offices involved in system acquisition.
- Appoints a representative to the SRG.

**1.2.6. Directorate of Test and Evaluation (AF/TE) AF/TE:**

- Develops survivability-related test and evaluation policy, programs, and resources.
- Ensures that all requirements are testable.
- Ensures that responsible commands conduct required tests and evaluations of system survivability.
- Appoints a representative to the SRG.

## Chapter 2

### FIELD PROCESS

**2.1. General.** Each organization outside of HQ USAF keeps survivability OPRs fully informed of any action it takes or proposes that will or might significantly affect the survivability of any system during its life cycle. These actions include changes to required resources, such as funds, personnel, and training. For additional responsibilities for commanders and facility managers, see **Chapter 3**.

**2.2. Single Managers (System Program Directors, Product Group Managers (PGMs), and Materiel Group Managers(MGMs)).** Single managers:

- Oversee survivability programs for their products.
- Ensure that proven survivability design criteria are applied. For example
  - Critical placement of subsystems.
  - Protection of critical components.
  - Sound component and subcomponent design.
  - Susceptibility reduction.
- Prepare and submit annual SMSRs (RCS: SAF-AQQ(A) 7102) for all systems, including subsystems and components, past acquisition Milestone I (or the equivalent for nonmajor systems) throughout the life cycle.
- Systematically review survivability management programs and include findings in SMSRs.
- Submit a consolidated SMSR or separate SMSRs for systems with requirements in more than one threat category. For example, for a system with requirements to survive in nuclear and NBC-contaminated environments, either submit a single consolidated SMSR to two survivability OPRs or submit two separate SMSRs, one to each OPR.
- Send annual reports covering the preceding fiscal year to the survivability OPR by the end of the calendar year. For format and submission requirements, see **Attachment 2**.
- Petition the survivability OPR for a waiver to the SMSR requirement if data already exists in acquisition documents or if requirements are deleted.
- Reference documents that already contain survivability data and make them readily available to the survivability OPR.
- Work with Defense Logistics Agency and other logistics organizations to ensure that personnel have access, through the logistics system, to hardness critical items and other equipment and materiel required for survivable systems.

**2.2.1. System Program Directors. SPDs:**

- Develop and execute system survivability programs (including HAMS) throughout the life cycles of their systems.
- Develop and ensure the system survivability test program is included in the TEMP.
- Prepare annual SMSRs for systems that have passed Milestone I or equivalent, with support from their product and materiel group managers.

- Coordinate SMSRs through the using organizations and forward the reports through Designated Acquisition Commanders (DACs), or PEOs to the appropriate survivability OPR.

### **2.2.2. Product Group Managers or Materiel Group Managers:**

- Develop and execute survivability programs (including HAMS) for the life cycle of their products or materiel.
- Prepare SMSRs for products and materiel with survivability requirements, coordinate the SMSRs with SPDs, using organizations, and DACs, and submit the reports annually to survivability OPRs.

### **2.3. Major Commands (MAJCOM). Commanders at all levels:**

- Review system survivability, threat estimates, and threat negation technologies to identify deficiencies or actions that affect the survivability of their systems. Coordinate with gained Air Reserve Components as required.
- Recommend corrective actions to SPDs, survivability OPRs, and other appropriate organizations.

#### **2.3.1. Using Commands.** Using commands, including the Air Force Reserve and Air National Guard:

- Provide initial survivability requirements and review SMSRs for systems they employ.
- Work with Air Force Materiel Command (AFMC) to carry out HAMS programs for hardened systems or facilities.

#### **2.3.2. Air Force Materiel Command. AFMC:**

- Identifies specific organizations to assist in developing survivability parameters for using commands and SPDs, including:
  - Thresholds: the minimum acceptable performance requirements.
  - Objectives: values above the threshold that provide beneficial performance impacts.
  - Provides test centers for developmental tests and evaluations.
  - Works with using commands to carry out HAMS programs for hardened systems or facilities.
  - Establishes POCs at depots to ensure that personnel properly conduct HAMS of fielded systems.

### **2.4. Field Operating Agencies (FOA).** FOAs support their parent organizations by giving technical advice and developing programs. For example, the Air Force Civil Engineering Services Agency provides facility-hardening technology for civil engineers.

### **2.5. Air Force Operational Test and Evaluation Center (AFOTEC).** AFOTEC:

- Performs operational test and evaluation of systems to assess their survivability.
- Reviews TEMPs to ensure requirements are testable, and that planned test and evaluation activities will provide results needed to determine if the system meets its operational requirements.

### **2.6. Managers of Hardened Facilities.** Hardened-facility managers work with base organizations to determine HAMS program responsibilities for:

- Developing procedures.
- Procuring parts.
- Running awareness training programs.
- Scheduling periodic tests.
- Conducting inspections, evaluations, and assessments of the system throughout its life.

## Chapter 3

### PROGRAM PROCEDURES

#### 3.1. Pre-Milestone 0 -- Determination of Mission Need.

3.1.1. Using organizations usually develop the Mission Need Statement (MNS). *EXCEPTION:* Any organization that identifies a specific mission area need or deficiency may submit an MNS.

3.1.2. MNS developers:

- Identify potential threats to a system and the desired mission-level capabilities for the system within the threat environments, or the lack of such a requirement.
- Reevaluate the system's survivability requirements before Milestone 0 if the mission, threat, or operational characteristics subsequently change.
- Ensure the MNS contains a requirement for a Program Protection Plan.
- Include threat information from:
  - The Threat Environment Definition (TED).
  - The System Threat Assessment Report (STAR).
  - Other threat definitions approved by the Air Force and validated by the Defense Intelligence Agency.

3.1.3. For existing systems for which the threat or mission changes, users:

- Evaluate the system through analysis and testing to determine whether a vulnerability or susceptibility exist.
- Consult the appropriate test agencies for guidance on all testing.

3.1.4. If users identify a vulnerability or susceptibility, and determine that a system requires major changes, they:

- Develop a MNS.
- Clearly state the deficiency in the MNS and propose potential solutions.

3.1.5. In some cases, users may retrofit survivable subsystems into systems that originally had no survivability requirements. Users treat the survivability program for these subsystems as they would the survivability program for full systems.

**3.2. Milestone 0 -- Concept Studies Approval.** The Milestone Decision Authority (MDA) determines whether:

- Concepts developed during phase 0 address applicable survivability threats so that the system can meet desired mission-level capabilities.
- The user has identified survivability constraints as exit criteria for phase 0.

#### 3.3. Phase 0 -- Concept Studies.

3.3.1. For Acquisition Category (ACAT) I programs, AF/IN convenes a threat working-group to define specific operational threat environments for the system.

3.3.1.1. The working group consists of personnel from:

- AF/IN.
- The user and operating command.
- The product group intelligence office.
- Other HQ USAF organizations, as appropriate.

3.3.1.2. The STAR drafter:

- Develops the STAR based on the working group's findings
- Sends it to AF/IN for approval.

3.3.1.3. The user or user representative develops the threat assessment for ACAT II-IV systems as a stand-alone document or as part of the Operational Requirements Document (ORD) assessment.

3.3.1.4. AF/IN approves the threat assessment for ACAT II-IV systems.

3.3.2. Users or user representatives develop the initial ORD in this phase. The ORD developer:

- Specifies the initial survivability requirements corresponding to the threat environments listed in the MNS.
- Provides the rationale for systems with no survivability requirements.
- For systems required to continue operations during or after the threat environment, presents strategies used to achieve survivability, such as:
  - Redundancy.
  - Threat-effect tolerance.
  - Active defense.
  - Deception.
  - Hardness.
  - Reconstitution.
  - Avoidance
  - Proliferation.
- Expresses the ORD's survivability requirements in terms of measurable thresholds (that is, minimum acceptable performance requirements) and objectives (that is, values above a threshold having a beneficial performance impact).
- Tailors the ORD requirements to the developed concepts and reflects the system and/or mission level performance requirements.
- Addresses hardness assurance, maintenance, and surveillance requirements in the ORD.

3.3.3. Users develop survivability requirements by interacting with the AFMC organizations developing survivability parameters or by referring to established guidance on survivability parameters. For example, for systems that must survive in nuclear or Advanced Technology Weapons (ATW) environments, users:

- May consult with AFMC's Office of Aerospace Studies (OAS) or refer to the Air Force Materiel Command Pamphlet 62-201, *The AFMC Generic Survivability Parameter Handbook* for the initial survivability requirements and parameters in the ORD.
- Consult with the OAS Survivability Criteria Division (or the corresponding organization for other threats) to choose meaningful parameters that satisfy the initial survivability requirements.

3.3.3.1. AFMC forwards a copy of the recommended initial survivability parameters to HQ USAF/XOR and the appropriate survivability OPR.

3.3.4. Users or user-designated agencies performing the Cost and Operational Effectiveness Analysis (COEA) use the initial survivability requirements and parameters in the ORD for their tradeoff studies. In the COEA:

- Address survivability strategies to support concept selection at Milestone I.
- Include a sensitivity analysis of how changes in the threat affect survivability.

3.3.5. SPDs:

- Address survivability in the Milestone I Integrated Program Summary (IPS) (see DoD 5000.2-M) in the following sections:
- Section 1 (survivability exit criteria satisfaction).
- Section 4 (key survivability objectives and strategies against mission threat).
- Section 7 (system survivability sensitivity and risks).
- Section 9 (key survivability requirements for phase I).
- Incorporate minimum acceptable parameters for ORD requirements in the Acquisition Program Baseline (APB) at Milestone I and the TEMP.
- Coordinate the TEMP with the user and OT&E agency.

### **3.4. Milestone I -- Concept Demonstration Approval.** The MDA:

- Determines whether to establish a new acquisition program based on data developed during phase 0.
- Approves the APB and the survivability exit criteria for phase I.

### **3.5. Phase I -- Demonstration and Validation.**

3.5.1. The Program Element Monitor (PEM) prepares the Program Management Directive (PMD). The PMD:

- Directs personnel to satisfy survivability requirements for each threat category. If no survivability requirements exist, the PMD states this along with the supporting rationale.
- Tasks the PEO or DAC organization and user to support AFMC survivability parameter studies.
- Identifies the organizations responsible for conducting survivability related testing and analysis.

3.5.2. The SPD forwards a copy of the program deviation report through appropriate channels for any program breach of a survivability threshold identified in the approved APB at Milestone I, if that threshold is a key parameter.

3.5.3. If the user, AFMC, PEO, SPD, or a HQ USAF organization deems it necessary, AFMC:

- Conducts survivability studies to refine the initial survivability parameters established in the ORD and APB at Milestone I.
- Bases these studies on phase 0 results, COEA, and cost assessments.
- Convenes a Survivability Working Group (SWG) of staff officers from the user organization, program office, other AFMC organizations, Air Intelligence Agency, AFOTEC, HQ USAF/XOR, and other HQ USAF organizations to review the refined recommendations for survivability parameters.

3.5.3.1. The SWG forwards the refined recommendations and any written nonconcurring opinions to the user and SPD with copies to the survivability OPR and other appropriate HQ USAF organizations.

3.5.3.2. On the basis of the AFMC recommendations and the SWG review, the user and SPD refine survivability requirements, objectives, and thresholds for the ORD and Milestone II APB.

3.5.3.3. AFMC forwards any significant unresolved issues remaining from the SWG, user, or SPD to the Survivability Review Group (SRG) for resolution.

3.5.3.4. User updates and expands ORDs to include new survivability parameters and requirements as personnel refine performance capabilities and characteristics. Base the updates on concept maturity, results of tradeoff studies, and testing conducted during phase I.

3.5.4. SPDs:

- Update the HAMS program in the Integrated Logistics Support Plan (ILSP) if the system under development uses hardening as a survivability strategy.
- Update the HAMS program for systems housed in hardened facilities with the help of the organizations responsible for the facility.
- Address survivability for Milestone II in the same IPS sections as listed in paragraph 3.3.5.

3.5.5. Users or user-designated agencies performing the COEA refer to the survivability requirements in the updated ORD for COEA tradeoff studies.

3.5.6. The user and the DAC or PEO coordinate on the annual Survivability Management Status Reports. (See **Attachment 2**.)

3.5.7. Users may request a waiver of the live fire testing requirement if these tests incur an unreasonable expense or are impractical (see DoD 5000.2-M, part 11).

**3.6. Milestone II--Development Approval.** At the conclusion of phase 1, the MDA:

- Assesses program affordability and approves the Milestone II APB.
- Approve the survivability exit criteria for phase II.

**3.7. Phase II--Engineering and Manufacturing Development.**

3.7.1. Users don't change survivability constraints during this phase. *EXCEPTION:* A change in the threat or mission warrants making changes during this phase.

3.7.2. SPDs address configuration control for survivability-related designs and processes in the System Configuration Baseline.

3.7.3. SPDs and test agencies update TEMPs to reflect changes in survivability requirements identified during Phase I.

3.7.4. Test agencies conduct live fire testing as required by Title 10, United States Code.

3.7.5. SPDs integrate Initial Operational Test and Evaluation (IOT&E) survivability data and test configuration requirements into Developmental Test and Evaluation.

3.7.5.1. IOT&E survivability assessments, including estimates of operational effectiveness and suitability in hostile environments, support Milestone III decisions.

3.7.6. As part of the Integrated Logistics Support Plan for hardened systems, SPDs work with organizations responsible for executing the HAMS program to develop and periodically assess:

- The hardness assurance program. Ensure that the produced system meets hardness design requirements.
- The hardness maintenance program. Ensure that personnel properly identify hardness-critical items and procedures in drawings and technical orders and that personnel in maintenance, purchasing, engineering, and management receive awareness training (see MIL-STD-1766B as an example).
- The hardness surveillance program to ensure that it includes procedures for detecting degradations due to use, environmental exposure, maintenance, or aging and for monitoring the effectiveness of maintenance (see MIL-STD-1766B as an example).

3.7.7. For systems installed in hardened facilities or shelters, SPDs work with the responsible organizations to ensure that the facility or shelter provides the appropriate protection for the system and that the system and the facility aren't degraded as a result of installation.

3.7.8. SPDs address survivability for Milestone III in the same IPS sections as listed in paragraph 3.3.5.

**3.8. Milestone III -- Production Approval.** At the conclusion of phase II, the MDA:

- Assesses program costs, feasibility, and suitability.
- Establish the APB at Milestone III.
- Approve the survivability exit criteria for phase III.

**3.9. Phase III -- Production and Deployment.** During this phase, personnel integrate survivability requirements into the production process.

3.9.1. SPDs:

- Implement the HAMS plans in the ILSP.
- Continue to work with HAMS responsible organizations.

- For systems installed in hardened facilities or shelters, work with organizations or facility managers to ensure that the facilities or shelters support the systems survivability requirements.
- Ensure that the HAMS program functions properly.

3.9.2. OT&E agencies run follow-on operational tests and evaluations, including estimates of operational effectiveness and suitability in hostile environments.

3.9.3. Users periodically monitor the projected threat through the operational phase. In some cases, because of enhanced threat characteristics, users enhance survivability with retrofits, new tactics, or other strategies.

### **3.10. Milestone IV -- Major Modification Approval.**

3.10.1. When considering a major system upgrade or replacement, users reevaluate system survivability to determine whether a changed threat or revised operational concept causes survivability degradation. If a major system upgrade or replacement is necessary, users redraft a determination of mission need.

3.10.2. Based on the user's input and a milestone review, the MDA:

- Determines whether a system in production requires major upgrades.
- Establishes an approved acquisition strategy and baseline for the program.

**3.11. Phase IV -- Operations and Support.** This phase begins at initial operational capability and overlaps with phase III.

3.11.1. Users and SPDs:

- Sustain survivability through the HAMS program (established in phase III).
- Monitor the system to determine the effects of aging and maintenance on its survivability.

3.11.2. For systems that were fielded before the present DoD acquisition process with requirements to survive any of the six threat environments, the SPD develops a system survivability program, including HAMS (see DoD Directive 5000.1 and DoD Instruction 5000.2).

CLARK G. FIESTER  
The Assistant Secretary of the Air Force for Acquisition

## Attachment 1

### GLOSSARY OF REFERENCES, ABBREVIATIONS, ACRONYMS, AND TERMS

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***Abbreviations and Acronyms***

**ACAT**—Acquisition Category

**AFI**—Air Force Instruction

**AFMC**—Air Force Materiel Command

**AFOTEC**—Air Force Operational Test and Evaluation Center

**AFPD**—Air Force Policy Directive

**AFR**—Air Force Regulation

**AFSARC**—Air Force Systems Acquisition Review Council

**APB**—Acquisition Program Baseline

**ATW**—Advanced Technology Weapon

**COEA**—Cost and Operational Effectiveness Analysis

**C<sup>3</sup>I**—Command, Control, Communications, and Intelligence

**DAB**—Defense Acquisition Board

**DAC**—Designated Acquisition Commander

**DoD**—Department of Defense

**FOA**—Field Operating Agency

**HAMS**—Hardness Assurance, Maintenance, and Surveillance

**ILSP**—Integrated Logistics Support Plan

**IOT&E**—Initial Operational Test and Evaluation

**IPS**—Integrated Program Summary

**MAJCOM**—Major Command

**MDA**—Milestone Decision Authority

**MGM**—Materiel Group Manager

**MNS**—Mission Need Statement

**NBC**—Nuclear, Biological, Chemical

**NSNF**—Non-Strategic Nuclear Forces

**NSSG**—Nuclear Survivability Steering Group

**OAS**—Office of Aerospace Studies

**OPR**—Office of Primary Responsibility

**ORD**—Operational Requirements Document  
**OT&E**—Operational Test and Evaluation  
**PEM**—Program Element Monitor  
**PEO**—Program Executive Officer  
**PGM**—Product Group Manager  
**PMD**—Program Management Directive  
**SMSR**—Survivability Management Status Report  
**SPD**—System Program Director  
**SRG**—Survivability Review Group  
**STAR**—System Threat Assessment Report  
**SWG**—Survivability Working Group  
**TED**—Threat Environment Definition  
**TEMP**—Test and Evaluation Master Plan

*Terms*

**Advanced Technology Weapon**—Weaponry that uses new concepts and technical advances and may not yet be fielded. Examples include:

- Directed energy weapons such as lasers, neutral particle beams, and high power microwave devices.
- Innovative kinetic energy weapons such as the electromagnetic gun.

**Assess**—Appraise the worth of a system based on an analysis of data explicit enough to provide an understanding or interpretation. Assessments may serve as guides for further action. This term can also be applied to the aspects of testing that require judgment and experience, rather than those that provide specific, quantifiable measurement.

**Covered System**—A vehicle, weapon platform, or conventional weapon system that includes features designed to protect users in combat.

**Endurance**—The capability of a system to continue to perform its mission over the long term, such as days, weeks, or months.

**Hardness**—The ability of a system to withstand hostile environment. Hardness features may include:

- Filters.
- Coatings.
- Shielding.
- Configurations.

**Hardness Assurance**—Actions taken to ensure that systems are produced with the required hardness.

**Hardness Critical Item**—A part or component essential in maintaining a system's hardness and operational effectiveness.

**Hardness Critical Procedures**—Procedures essential to maintain a system’s hardness and operational effectiveness.

**Hardness Maintenance**—Actions taken to ensure that hardness doesn’t degrade below required levels over the life cycle of the system. Maintenance procedures, system changes, aging, and other factors can cause degradation. Hardness maintenance is a subset of hardness sustainment.

**Hardness Surveillance**—Actions taken to monitor the hardness status of a fielded system throughout its life cycle, including identifying and locating degradations. Hardness surveillance is a subset of survivability surveillance.

**Implementing Organization**—The command (AFMC) or organization (PEO) appointed by the Air Force Acquisition Executive to manage an acquisition program.

**Life Cycle**—The total phases through which an item passes from the time it is initially developed until the time it is either consumed in use or disposed of as being excess to all known materiel requirements. (Joint Pub 1-02)

**Mission Critical System**—A system whose operational effectiveness and suitability are essential to successful mission completion or to overall combat capability.

**Operational Effectiveness**—An assessment of a system’s effectiveness that takes into account organization, doctrine, tactics, survivability, vulnerability, and threat when used by representative personnel in expected operational environments.

**Proliferation**—An increase in the number of units to cover expected losses in hostile environments.

**Requirement**—An established need justifying the timely allocation of resources to achieve approved military objectives, missions, or tasks.

**Redundancy**—The use of multiple systems, system elements, communication links, or other means of accomplishing a task that contribute to mission accomplishment by allowing the overall function to continue if one or more of the multiple elements is damaged.

**Survivability**—The capability of a system to avoid or withstand manmade hostile environments without suffering an abortive impairment of its ability to accomplish its designated mission. (DoD Instruction 5000.2)

**Survivability Assessment**—An assessment of the survivability of a system performed during the acquisition and operational phases of a system’s life cycle. Survivability assessments take into account:

- Changes in the threat.
- Revisions to the system's operational scenarios.
- Degradation of survivability features.

**Survivability Parameters**—Measurable standards of system performance or characteristics that enable the system to achieve required survivability. Any survivability strategy may have associated parameters. For example, the parameters for avoidance might specify a minimum radar cross-section; for proliferation, the purchase of extra systems. Reconstitution parameters might specify a maximum amount of time allowed for repairs. Hardening parameters may include specifications for environments and threat insensitivity. Parameters define the minimum threat environment levels that systems must withstand.

**Survivability Sustainment**—Actions taken to preserve a fielded system’s survivability over its life cycle. Specific measures to maintain survivability could include:

- Adherence to or revision of operating procedures.
- Additional proliferation.
- Hardness maintenance.
- Hardness retrofit programs.

**Survivability Strategies**—Methods of meeting survivability requirements. Survivability may be achieved through one or more of these strategies:

- Active defense.
- Avoidance.
- Deception.
- Hardness.
- Proliferation.
- Reconstitution.
- Redundancy.
- Threat-effect tolerance.

Commands develop preferred strategies based on:

- Mission.
- Specific threats.
- Operating conditions.
- Expected scenarios.
- Cost and performance.
- Reliability and maintainability.
- Logistics support and other system requirements.

**Survivability Surveillance**—Actions taken to check the survivability status of a fielded system throughout its life cycle. Surveillance personnel check for:

- Revisions to a system's operating procedures.
- Hardness degradation.
- Avoidance degradation.
- Decreased proliferation.

**Susceptibility**—The degree to which a device, piece of equipment, or system is open to effective attack due to inherent weaknesses. Susceptibility takes into account several factors, including:

- Operational tactics.
- Countermeasures.
- Chances of enemies fielding a threat.

**System**—Any organized assembly of resources and procedures united and regulated by interaction or interdependence to perform a set of specific functions. (Joint Pub 1-02)

**User Organization**—The primary organization operating a system, subsystem, or piece of equipment.

Generally applies to those operational commands or organizations designated by HQ USAF to conduct or participate in operations or operational testing.

**Vulnerability**—The characteristics of a system which cause it to suffer a definite degradation (incapability to perform the desired mission) as a result of having been subjected to a certain level of effects in an unnatural (manmade) hostile environment. (Joint Pub 1-02)

## Attachment 2

### DRAFTING SURVIVABILITY MANAGEMENT STATUS REPORTS, RCS: SAF-AQQ(A) 7102

**A2.1.** Single managers must prepare annual SMSRs for each system (including subsystem components) that have passed acquisition Milestone I (or equivalent, for nonmajor systems) and that have survivability requirements in the ORD. They update the report throughout all phases of the system's life cycle.

**A2.2.** HQ USAF OPRs use SMSRs to assess the Air Force system survivability program.

A2.2.1. This assessment ensures that personnel can rapidly identify and resolve survivability problems during the system's life cycle.

A2.2.2. Single managers (primarily SPDs) use SMSRs as a communications link so that those having similar problems can work together on a solution.

**A2.3.** For systems with survivability requirements for more than one threat category, SPDs submit a consolidated report to the appropriate survivability OPRs or separate reports for each category. SPDs coordinate these reports with the users and forward the reports to the HQ USAF OPR through the appropriate DAC or PEO.

**A2.4.** The survivability OPR serves as the waiver granting authority for SMSRs.

A2.4.1. The OPR may grant waivers if the SMSR data exists in other documents or if requirements change. SPDs must reference the appropriate documents in their waiver requests and ensure that the documents are on hand or can be easily copied.

**A2.5.** SPDs must submit SMSRs annually by 31 December for the prior fiscal year. SMSRs are designated emergency status code D. Discontinue reporting during emergency conditions. Submit reports according to **Table A2.1**.

**Table A2.1. Survivability OPRs.**

Threat Category	Submit SMSRs To:
Nuclear (affecting all systems) & advanced technology weapons (affecting other than space systems)	SAF/AQQS
Conventional (affecting aircraft)	SAF/AQPF
Conventional (affecting facilities)	AF/CEOR
ATW (affecting space systems)	SAF/AQSC
NBC Contamination (affecting all systems)	SAF/AQPT
Electronic Warfare (affecting all systems)	SAF/AQPE

**A2.6.** MSRs may be classified, but should not include any Special Access Requirement information. In the SMSR, include the following paragraphs:

**A2.6.1. System Description.** List the full name of the system and any associated acronyms. Describe the system and its stage in the acquisition life cycle. What is the initial operating capability

for systems currently in development? If the system is operational, list where it is deployed and how many are in operation or how many you need to purchase. Include major milestones, dates, and numbers.

**A2.6.2. Survivability Requirements and Criteria.** State the system's quantitative survivability requirements and survivability strategies. Reference documents that establish survivability requirements and parameters. List parameters, reviews, and analyses along with dates. For systems with extensive survivability requirements, summarize this section in an attachment to the report. If waivers to requirements or criteria exist, list these waivers, who approved them, and when.

### **A2.6.3. Survivability Status.**

#### **A2.6.3.1. Assess Survivability.**

- Assess the system's survivability based on test results, test plans, test article and facility requirements, and analyses..
- State how many systems or components have known degradations that compromise their survivability. (For example, of all widgets tested, x out of y have known degradations to their nuclear hardness.)
- State whether or not their survivability staff expects the system as a group (for example, all B-52s) would survive in projected operational threat environments.
- Show the date of the last survivability assessment and what personnel have accomplished since then.
- Explain future survivability plans. Does the survivability plan meet requirements? Refer to documents, tests, and other data that substantiates these conclusions. How does the survivability of other related systems or facilities bear on the survivability of the system covered by this report?

#### **A2.6.3.2. Assess Hardness, Assurance, Maintenance, and Surveillance.**

- Describe procedures in effect that prevent degradation of survivability below threshold levels.
- State whether the HAMS plan for the system or the facility in which it is employed is in place and explain its impact on operations.
- Give the date when fielded systems were last checked for survivability and summarize the test results.
- Reference other tests and documents.
- Summarize expected procedures for hardness assurance, maintenance, and surveillance for systems under development. At minimum, give the status of:
  - HAMS plans and programs.
  - Hardness databases or centers.
  - System survivability models.
  - Notes developed for engineering drawings.
  - Technical orders and manuals.
  - Configuration controls and transfers.

- Survivability awareness training.

**A2.6.3.3. Survivability Test Resources.**

- Describe test resources needed to verify hardness levels and survivability specifications.
- Discuss availability of resources and your funding status.
- Clearly distinguish between documented and funded plans versus preliminary unfunded objectives.

**A2.6.3.4. Problems and Solutions.**

- Cover existing or potential major survivability problems, proposed solutions, and survivability funding shortfalls.
- Describe actions to resolve any problem areas.

**A2.6.3.5. Remarks.** Provide additional explanations, concerns, actions, or requirements.

**A2.6.3.6. Coordination.** Identify the using command(s) for the system. List the organizations that gave their input or submitted comments about this report. Attach comments.

**A2.6.3.7. Preparer.** List your name, office, and telephone number.